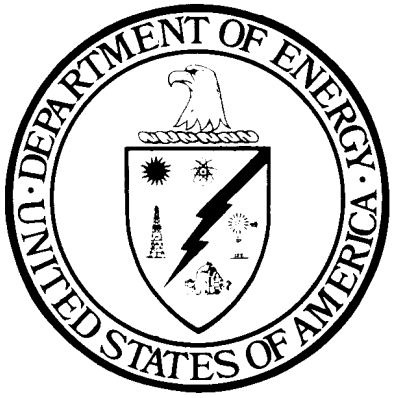
Integrated Safety Management System

Phase II Verification at the Y-12 Plant at the

Oak Ridge Site

VOLUME I



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Washington D.C.

I, by signature below, concur with the recommendations of the LMES ISMS Verification Team, Team Leader, and Senior Advisor.

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EXECUTIVE SUMMARY

The Department of Energy (DOE) commits to accomplishing its mission safely. To this end, contractors must integrate safety into management and work practices at all levels so that programs, processes, and objectives are achieved while protecting the public, the worker, and the environment. This report documents the results of the review conducted to verify: (1) that Lockheed Martin Energy Systems (LMES) Integrated Safety Management System (ISMS) Description and enabling documents and processes are implemented; and (2) that Oak Ridge Operations Office (DOE-ORO), in particular the Assistant Manager Defense Programs (AMDP), has documented processes that integrate their safety activities and oversight with those of the LMES.

The LMES ISMS assessment was based on the Department's continuing core expectations (CCEs) for ISMS and was conducted almost concurrently with this review. In preparation for the corporate review, line management also conducted comprehensive self-assessments to the same CCEs. Our team selectively sampled ISMS in areas not specifically sampled by the corporate review and also validated the results of the LMES assessment. The results of both these self-assessments were shared with this team. The data from the two LMES efforts allowed this team to have a broad sample set as a basis for its conclusions.

The Team Leader selected a team that to the extent feasible used members who had participated in the August 1998 Phase I/II Verification. The remainder of the team consisted of members who were experienced at ISMS verification or were members of the ORO staff with excellent knowledge of DOE expectations for ISMS. The review team was divided into the following functional area review sub-teams: Business, Budget, and Contracts (BBC); Management (MG); Operations and Implementation/Subject Matter Experts (OI/SME); Hazard Identification and Standards Selection (HAZ); and DOE. These sub-teams conducted their review over a period of approximately two weeks on site using the Review Plan that combined the CCEs and Phase II core expectations.

The LMES ISM system is based upon line managers being responsible for ISM in their organizations. The managers are directed to utilize the Operational Safety Board (OSB), New Activity Startup and Hazard Identification Planning, Plan of the Day, and assessments as mechanisms to initiate and continuously improve the status of implementation. Most of the line managers, in the organizations that were reviewed, were positive with regard to the LMES ISMS effort and were striving for full implementation consistent with senior management policy and tailored direction. Furthermore, the workforce has welcomed the opportunity to have increased participation in assuring their abilities to perform work safely. Despite this, some line managers have not achieved implementation of the mechanisms.

As noted in the August 1998 verification, LMES has developed the mechanisms to support a fully implemented ISMS. Also, during the 1998 verification, the team identified nine Opportunities for Improvement. Five of these remain that have a significant impact on achieving the required level of implementation of the LMES system. These include:

- Mechanisms to force consistent use of ISMS across the Y-12 Plant.
- ISMS mechanisms to ensure consistent operations and maintenance across the Y-12 Plant.
- Fire protection
- The issues management process
- Implementation of consistent training requirements for ISMS throughout the Y-12 Plant.

This Verification Team notes that the efforts to address these "opportunities" did not meet expectations, and again considers them to be fundamental to achieving implementation of the LMES ISMS Description. However, the team acknowledges that these opportunities may have undergone a change or been expanded. For example, the training issue (discussed in this report) has expanded to raising the entire maintenance staff to an appropriate level of knowledge concerning the requirements. The recent decision by the General Manager to use the Production Leadership Team to be the forcing function for consistent implementation of ISMS is producing needed improvements.

During this review, several aspects of the LMES ISMS were noted to have evolved in response to lessons learned. One was the establishment of the Technical Division whose mission is to consolidate and coordinate the engineering efforts of Y-12. This organization will serve as the design authority and provide the required support teams for line management. This is a positive step and should be rigorously pursued to completion.

Lockheed Martin initiated a comprehensive analysis of several Type A investigations that provided superb insight into four common factors that were part of each event. By focusing on these factors, LMES will be able to achieve continuous improvement in their ISMS.

During the 1998 ISMS Verification, it was noted that the implementation of ISMS depended in part on line management's effective utilization of the Operational Safety Board (OSB) concept. This remains a challenge. However, due to feedback from the Independent Assessment an effort to improve the OSB's performance with regard to work control was initiated during this verification.

The Project Management Systems for both DOE and the contractor require improvement. The Modernization Program Advisory Team recommendations and the Project Management Corrective Action Plan can be rolled up into a Comprehensive Project Management Improvement Plan.

The LMES used Chapter 4 of the DOE ISMS Guide to conduct annual, independent assessments of the ISMS. These assessments have been comprehensive and technically sound, representing a significant source of data. It is noted that the System has yet to produce the analysis of that data to aid senior management in their effort to fully implement ISMS.

A significant obstacle to achieving implementation of ISMS remains in the core function of Feedback and Continuous Improvement. Analysis of the numerous data streams on performance must be accomplished in an integrated manner to allow senior management to initiate appropriate modifications or re-enforcements to the ISM systems. Also, formal evaluations of

the effectiveness of corrective actions taken in response to identified issues are required but do not appear to be a common practice.

The team observed two specific occasions where the ISMS mechanisms were not used when it would have been appropriate. One event was the investigation of a near miss and the other related to deficiencies in the site support infrastructure.

With regard to the DOE AMDP organization, significant changes have been made in conjunction with the establishment of the National Nuclear Safety Administration (NNSA). AMDP has been reorganized and the number of staff is being increased. Opportunities for improvement here include: improving documentation covering roles and responsibilities, implementation of procedures for the Work Authorization Document (WAD) process, review and update of Site procedures, and reconciliation of inconsistent LMES budget/finance submissions. Staffing and training a cadre of project managers remains a challenge.

CONCLUSION

This team agrees with the conclusions in the LMES ISMS Independent Assessment.

ISMS is considered implemented when the contractor has the mechanisms in place to fulfill the policy, which is stated simply as "perform the mission safely". The process of achieving the state of "implemented" includes recognizing opportunities to improve and correcting shortcomings.

The ISMS has been implemented in EUO and a portion of the Manufacturing Group (Nuclear Operations) and is maturing in a satisfactory manner. With isolated exceptions, the organizations in the Balance of Plant remain at varying stages of attempting implementation. Site-wide aspects of the ISMS associated with the Feedback and Continuous Improvement core function are not implemented.

A significant obstacle to achieving implementation of the described ISM System is the absence of a site-wide evaluation mechanism that can provide senior management with the System's current status. Without an analysis of the numerous data streams, the Production Leadership Team is hampered in the development of necessary corrective actions and by the inability to evaluate the effect of corrective actions on improving the system. Examples of where this type of analysis would have been very useful include the status of fire protection systems, of maintenance, and of calibration. These examples may also be indicators of a need for a more rigorous review of the budget requirements that need to be funded to achieve compliance in mission support and overhead areas. Additionally, such a site-wide analysis would have determined where line management had failed to reach the desired expectation of the system. The Production Leadership Team must have the data to ensure that line management is held accountable for full implementation of the ISM System. The lack of progress in the full implementation of the ISMS might have been determined through more rigorous analysis of data collected by the FEB/Mission Success Organization but its oversight role for ISMS implementation has not been developed. The FEB/Mission Success Organization has not performed analyses consistent with the vision for that organization.

The opportunities for improvement noted in functions other than Feedback and Continuous Improvement were of such a nature that the current mechanisms would have resolved or prevented these issues from arising if feedback and improvement mechanisms functioned as described.

No issue identified was new or unique. All issues had been previously identified but the ineffectiveness of the Issues Management Process resulted in failure to successfully correct the issues.

RECOMMENDATIONS

It is recommended that this Y-12 management team, both DOE and contractors, continue to place emphasis on the development, implementation, and execution of a Feedback and Continuous Improvement function that enables them to enhance their ability to perform the Y-12 mission safely. The Leadership Team should continue to forcefully stress implementation of ISMS in Balance of Plant organizations and hold those line managers accountable to achieve the ISMS expectations.

The ISMS Independent Assessments and DOE P 450.5, Line Management Oversight results should provide the contractor with the ability to evaluate the effectiveness of system enhancements as implementation continues to mature. AMDP should consider using Headquarters personnel to assess the improvements of the DOE Safety and Oversight Program on a periodic basis.

KEY OPPORTUNITIES FOR IMPROVEMENT

LMES

- Continue implementation of ISMS in Balance of Plant
- Improve the assessment process at all levels
- Improve corrective actions and evaluate against expectations
- Ensure line managers are involved, accountable, and aware of budget submission and final action
- Enforce expectations regarding OSB, POD, and roles and responsibilities, with emphasis on work control

ORO

- DOE processes need formalization

1.0 INTRODUCTION

The Department of Energy (DOE) has committed to implementing a plan that will institutionalize an Integrated Safety Management System (ISMS) across the complex. This plan uses policy directives, guides, and contract clauses to describe the essential elements of the system for the Y-12 plant at the Oak Ridge Site (ORO).

DOE P 450.4, *Safety Management System Policy*, states that safety will be integrated into work practices in a systematic manner at all levels so that missions are accomplished while protecting the public, worker and environment. Consistent with and in support of this policy, the Department has prepared a guide, DOE G 450.4-1A, *Integrated Safety Management System Guide*, that facilitates the contractor's ability to develop the required system. The contract clauses are 48 CFR 970.5204-2 and 970.5203-78. These require the contractor to integrate ES&H into work planning and execution, comply with Federal, State, and local laws or regulations (List A), and comply with DOE contractual requirements (List B). The contract clauses allow for tailoring to ensure a safety management system suitable to a site's mission.

This review was conducted in support of the DOE Oak Ridge Operations Manager in accordance with the protocol for ISMS Verifications specified in DOE-HDBK-3027-99, *Integrated Safety Management System Verification Team Leader's Handbook;* and DOE G 450.4-1A. The DOE Oak Ridge Operations Manager appointed Joseph King as Team Leader for this verification. The ISMS Verification Team reviewed the submittal, associated documentation, and implementation.

A Review Plan was prepared detailing how the Phase II verification of the Y-12 Plant at the Oak Ridge site was to be completed. Just prior to the Headquarters verification, LMES conducted an Independent ISMS Internal Review also using the guidance of DOE G 450.4-1A to establish a process to assess the status of ISMS. This verification included a review of their results as well or using information from the 1999 ISMS review. The 2000 review was conducted 14-31 August 2000.

1.1 Purpose

The purpose of this Y-12 Phase II ISMS verification was to determine the adequacy of the ISMS implementation within the nuclear facilities and the adequacy of the progress to date in implementation at the remainder the Y-12 site.

1.2 Scope

The ISMS Verification Team assessed implementation of ISM across Y-12. The scope of the review at Y-12 included all ISMS verification Core Requirements specified in the ISMS Guide, which ensure evaluation of the core functions and guiding principles for Integrated Safety Management as defined in the DOE P 450.4.

The review assessed ISMS within each Y-12 division—including the effectiveness of the integration of ISMS processes and procedures "upward" to the site wide corporate system and how ISMS is coordinated and integrated "downward" to the individual facility and process. The review assessed the adequacy of the programmatic documentation of the LMES Plan at the individual facility level. The review also assessed the integration between LMES and ORO as well as the integration within LMES from the site wide to the process specific implementation. The standard for the review were the core functions and the guiding principles of Integrated Safety Management of DOE P 450.4.

The assessment as to the adequacy of the implementation used the results of previous reviews including the Integrated Safety Management Verification Phase I and Phase II conducted August 1998, readiness reviews conducted incident to the resumption efforts following the September 1994 shutdown of operations, and the Operational Readiness Review of Enriched Uranium Operations (EUO). The implementation portion of the review also considered the corrective actions from various assessments conducted during the resumption efforts in accordance with the implementation plan for Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 94-4. Finally, this verification was a detailed implementation verification evaluation within Y-12.

As the primary enriched uranium repository for the United States, Y-12 has the facilities and security systems for enriched uranium storage, chemical recovery and material purification, and fabrication. The mission, major processes, and hazards of Y-12 are as follow:

Activities, processes and programs at Y-12 Plant include:

- disassembly
- assembly
- materials testing
- enriched uranium operations
- receipt, storage and shipment of special nuclear materials

The DOE-DP Programs at Y-12 include:

- dismantling of nuclear weapons components returned from the national arsenal,
- serving as the nation’s storehouse for special nuclear materials,
- maintaining nuclear weapons components production capability and stockpile support, and
- providing special production support for other DOE program and customers.

1.3 Prerequisites

All prerequisite conditions defined in the Review Plan were met prior to the verification.

1.4 Sequence of Activities

The ISMS Verification Team received training to ensure they had an adequate understanding of the DOE ISMS Policy expectations, the specific ISMS description previously presented by LMES, and the plan and strategy for this Phase II review. The team completed preparation of

the Criteria Review and Approach Documents (CRADs) which are contained in the Review Plan and guided the conduct of the verification. The team member's biographies
Attachment C of this report.

The record of the evaluation was the Form 1, Assessment Form. A Form 1 was prepared for each Objective in the CRADs and was the vehicle that documents the basis for the conclusions
ective and criteria. Issues identified during the review of the
individual CRAD which warrant the attention of the ORO Manager or senior LMES

2.0 OVERALL APPROACH

The ISMS Verification Team reviewed the ISMS implementing mechanisms for Y-12 operations. The team evaluated the supporting procedures and processes against the guiding principles and core functions defined in DOE P 450.4 by using the objectives of the CRADs.

The CRADs for the review are included as Appendix II of the RP. The CRADs are identified by functional area. The five functional areas correspond to the five ISMSV sub-teams.

- Business, Budget and Contracts (BBC)
- Operations (OP) including Subject Matter Experts (SME)
- Hazards Identification and Standards Selection (HAZ)
- Department of Energy, Y-12 Office of Defense Programs, (DOE)
- Management (MG)

The DOE functional area sub-team was tasked to review Office of Defense Programs' (OPD) implementation of management of mission programs and certain key ISMS functions. The specific ISMS functions evaluated by the DOE sub-team included the scope of work, work authorization, and feedback and continuous improvement.

The Business, Budget and Contracts functional area sub-team was tasked to review the ODP and LMES team processes and implementation of processes for translating missions into work, setting expectations, identifying and prioritizing tasks, and allocating resources.

The Management functional area sub-team was tasked to review the definition of contractor's roles and responsibilities, specifically that line management responsibilities were documented and include the five core functions. In addition, the management functional area reviewed the implementation of these roles and responsibilities for the feedback and improvement functions.

The Operations functional area was tasked to review contractor's procedures and how those procedures lead the contractors to perform the five core safety management functions. This sub-team used Subject Matter Experts (SME) to verify that the core functions and principles of ISM were met for work planning in a manner consistent with the ISM guiding principles. A generic SME CRAD was developed and utilized in the evaluation of specific support disciplines, including fire protection and program management.

The Hazards Identification and Standards Selection functional area sub-team was tasked to review the ORO and the LMES processes for ISMS relating to hazards analysis and the processes related to the identification of safety standards and requirements and the tailoring of controls to the work being performed. In addition, this sub-team reviewed line management responsibilities and feedback as they related to hazards identification and standards selection.

The CRADs were the means of assessing the effectiveness of the implementing and integrating mechanisms to result in work being done safely and in accordance with the principles and functions of DOE P 450.4. The criteria and objectives were evaluated by attending facility presentations, reviewing reports produced as a result of past reviews and assessments, and observing ISMS-related activities.

3.0 RESULTS

This section provides a summary of the results of the ISMS verification with emphasis on the core functions. Detailed comments are contained in the Assessment Forms.

The implementation of ISMS in a large and diverse operation, such as Y-12, is a significant management challenge. The reviewers were able to use the results of the 1998 ISMS verification, as well as two LMES ISMS independent assessments and other external reviews to broaden their understanding of the operations.

This team witnessed the most recent independent assessment as a means to assess a feedback mechanism in progress and to gain an opportunity to witness operations and work controls. The information gained is factored into this team's conclusions. The performance of the Independent Assessment Team (IAT) was noteworthy.

During the review, two situations were identified that anecdotally reflect the immature status of implementation of ISMS at Y-12 in areas beyond the direct control of Manufacturing and EUO. In the first case, an event occurred during a maintenance action at the power plant. The event was classified as a near miss and a management critique was conducted. Some senior managers were apparently not informed of the events until questioned by the Verification Team the day following the event. When the circumstances of the near miss were briefed to the team, many of the important details that reflected on implementation of the ISMS were not described, although when questioned by the team it was apparent that the facts to reach the critical conclusions were known. Many of the details surrounding the near miss associated with work control and ISM were not developed during the critique. The draft occurrence report also lacked many important details. The event was an injury to a worker when a chain-fall being installed above a work site fell from the holding strap and grazed the face of the worker and landed on his arm causing possible muscle damage. A preliminary review of the situation and the work site points out many issues. The job had expanded and was outside of the work scope in the approved work package. No work planning, neither JHI nor JHAs, had been developed for the expanded scope of work. The expanded work scope was not approved. Provisions for working at heights were not in place. PPE was inadequate. Potentially inappropriate rigging techniques and equipment were used. Fire system sprinkler heads were made inoperable without provisions for a temporary modification or controls within the work package. In addition, the team noted a

number of inadequacies associated with maintenance procedures and technical repair specifications. This example shows the inadequate status of implementation of the Y-12 ISM System. Neither Work Control nor Feedback and Improvement functioned.

A second example that reflects the inadequate status of implementation of the Y-12 ISM System was the manner in which the deficient fire protection program was being addressed. There was no clear agreement between LMES and ODP concerning the compliance requirements of the fire protection program (Define Scope of Work). This team noted that the resources necessary to bring Y-12 fire protection program into compliance with DOE requirements was not clearly identified in the budget process (Balanced Priorities). The budget process had partially funded those requirements, but indicated the remaining funding was not required to be compliant (Feedback/Develop and Implement Controls). The misclassification of the unfunded requirements led directly to improper prioritization of this activity during the budget reduction exercise (Balanced Priorities). There was a clear disconnect from the technical requirements to the budget submission (Line Management Responsibility for Safety). Finally, there was a clear understanding that the contractual requirements reflected in the S/RIDs could not be met, however, that was not considered during the prioritization of the unfunded work (Develop and Implement Controls). These two anecdotal examples reflect the lack of implementation of the Y-12 ISM System outside of the nuclear facilities.

Define Scope of Work: Missions are translated into work, expectations are set, tasks are identified and prioritized, and resources are allocated.

The LMES ISM is based on line managers being responsible for the safe accomplishment of the mission. In this function, line management has generally been effective in identifying the tasks to be completed safely to accomplish the mission and in providing input into the budget process in a manner that allows the appropriate prioritization of work. In the area of Authorization Basis documents, the recent reorganization of the responsible group enables a much better prioritization and assignment of resources to the task. A few notable exceptions to this success exist, primarily in the area of fire protection that has been unable to resolve a significant backlog of maintenance. Similarly, it was noted by the IAT that there were numerous instances where required tests and maintenance inspections, including calibrations, were not being performed. The failure to factor tasks of mission and safety significance into this function is a concern. It may also be an indicator that some of the overhead and mission support tasks are not getting the level of review required in the budget process to clearly determine which requirements need to be funded to achieve full compliance with the contract.

Opportunity for Improvement

FP.2-3 Line management and ODP have failed to use ISMS mechanisms, in accordance with an agreed upon long-range plan, to raise the Y-12 Fire Protection Program to a compliant level.

HAZ.1-1 There is evidence that coordination between the preparation of Implementation Plans and supporting details for AB work and the final budget reconciliation process is not functioning well, which could lead to continued failure of meeting AB development commitments.

HAZ.1-4 The staff of FSD and contractor support is currently below that necessary to support the IP and to provide the Facility Safety Engineer function, which is important to the maintenance of facility operations within the Safety Authorization Basis.

Noteworthy Practice

SME.2-1 LMES The continuation of the MPAT for the review of the LMES Project Management System is noteworthy. It clearly provides a driving force for bringing the LMES Project Management System up to DOE expectations.

Analyze Hazards: Hazards associated with the work are identified, analyzed, and categorized.

ISMS procedures and mechanisms are in place to ensure that hazards are analyzed. The contract includes S/RIDs and WSS and there are procedures in place and functioning to ensure the proper flowdown of these analyses into LMES implementing procedures. A review of the budget showed that funds were requested which will allow significant progress toward full compliance with AB document requirements.

The Facility Safety Division is in the process of developing work instructions and task plans for AB projects to better control the accomplishment of work in accordance with commitments and to provide a training vehicle for new staff. However, these work instructions and task plans need to be more comprehensive in order to serve as management tools to ensure a disciplined approach to meeting ISMS commitments.

The IAT documented that several organizations did not require the use of ISMS mechanisms that are key to understanding hazards associated with performing work, specifically Y15-012, Hazard Identification Planning, and Y73-043, Job Hazard Analysis. This resulted in work packages that did not recognize the threat to the worker. This team found a similar lack of hazard analysis in areas they sampled independent of the IAT.

Opportunity for Improvement

HAZ.1-3 Work instructions and task plans are not yet sufficiently comprehensive to be able to serve as management tools to ensure a disciplined approach to meeting IP commitments.

HAZ.1-5 There is no sitewide audit program of the quality of Unreviewed Safety Question Determinations being performed by operating organizations.

Develop and Implement Hazard Controls: Applicable standards and requirements are identified and agreed upon, controls to prevent/mitigate hazards are identified, the safety envelope is established, and controls are implemented.

Once the hazards have been identified, the line managers must employ the approved process to plan the safe conduct of the work. The processes identified in the ISMS Description provide comprehensive direction and are considered to be an effective set. The IAT noted that there was

a "lack of an effective training program for maintenance planners, maintenance supervisors, planning specialists, and line managers responsible for the execution of maintenance" in their facilities and organization.

The results of the independent assessment and this review found that work packages had incomplete, missing, or improperly revised JHIs and JHAs. Thus, in some cases work instructions did not support the safe performance of maintenance.

Conversely, the IAT found that with regard to operation, the work force had increased their involvement in the work control process including job planning, JHIs and JHAs. The verification team concurs in these observations.

LMES management responded to the IAT issues of hazard identification as well as development of hazard controls by instituting an effort to ensure that the work packages were appropriately screened by line management, supported by the OSB. This effort will include training, mentoring, and the use of checklists. With appropriate follow-up, this should result in work packages that meet the requirements of the ISMS.

Opportunity for Improvement

OP.1-4 The basic guidance for OSB involvement in activities directs the Operations Manager (or System Owner or Organizational Manager) to utilize the OSB as specified in the associated site procedures for planning of work activities, technical reviews of documentation, etc. Few Operations Managers involve the OSB in review of maintenance activities for Grade 3 or 4 work. OSB involvement in maintenance activities below Grades 1 and 2 should be directed on a case by case basis to achieve consistency in hazards identification and development of controls.

HAZ.1-6 The effective use of OSBs is important to maintenance of operations within the documented safety basis of a facility. These operations appear to be lacking in formality and discipline.

Perform Work Within Controls: Readiness is confirmed and work is performed safely.

This function includes work authorization as well as its conduct. The existing LMES Work Control processes for operations and maintenance effectively capture the ISMS principles and functions.

In general, the Manufacturing Division's operations were consistent with the status observed in 1998, that is, ISMS was implemented in (formerly) Nuclear Operations. In other organizations the results varied. The issues with maintenance, both planning and execution, noted above, are applicable to this organization. The Enriched Uranium Operation has made significant progress in the conduct of operations. Supervisors and operators demonstrated ownership of the procedures. Maintenance issues similar to other organizations continue to be found.

In both EUO and Manufacturing, the training program, based on DOE 5480.20A, was effective and the operators were found to be competent. In the Balance of Plant organization, the status of

implementation varied. The IAT concluded that areas remain that "require significant management attention." The IAT reported that, "Although the line management of some organizations from the senior line manager to front line supervisors were actively engaged in executing their operations and responsibilities, there was a lack of consistent site-wide line management knowledge, accountability, and responsibility on a day-to-day basis for ongoing operation and support requirements. As a result, it was not until the completion of a recent internal ISM assessment, which was directed by the General Manager, that site-wide issues with the proper performance of JHI and JHA, effects of the maintenance backlog, and ineffective site management assessment programs were brought to management's attention for appropriate action. Many of these issues were identified during the FY 1999 ISM Independent Assessment."

This team further noted that in some cases, line managers used all of the flexibility in the process to reduce its impact on the old way of doing business and in the extreme cases were ignoring the direction in the command media.

Opportunity for Improvement

OP.1-1 Most organizations are not fully implementing the site-wide guidance concerning Plans of the Day (POD) in that most organizations have a daily POD process that only includes maintenance activities.

OP.2-2 There has been little or no training in the work control process and its various elements given to the personnel who are involved in the process. This includes those directly responsible for development of work packages and their supervisors as well as the facility/customer personnel and line managers who review and approve the packages. In most cases the only exposure has been required reading. The LMES Team also identified this issue.

Provide Feedback and Continuous Improvement: Feedback information on the adequacy of controls is gathered, opportunities for improving the definition and planning of work are identified and implemented, line and independent oversight is conducted, and if necessary, regulatory enforcement actions occur.

The ISM System at Y-12 is not effectively implemented within the feedback and continuous improvement function. The site-wide Management Assessment program is not effective. The requirements of the implementing mechanism are not in place. Analysis and reporting of information and trends from the management assessment efforts across Y-12 is not occurring as envisioned by the implementing mechanism. Organizational-level management assessment programs have wide variations of effectiveness. In addition, the individual organizational management assessment programs are different from each other in form and process so that limited integration is possible. The quality and the effectiveness of the individual programs varied from good to ineffective.

This ISMS team was unable to determine the process that might be used to determine the status of implementation of ISM and the resulting plan to assist in the improvement of the safety management system. The DEAR clause requires an evaluation of the effectiveness of the Safety System and that the contractor take steps to maintain the integrity of the entire system. The

command media assigns the responsibility for the approval of improvement plans to the ESG. The ESG charter provides the authority for implementation of ISM to the Production Leadership team. LMES needs an evaluation mechanism to determine the overall effectiveness of the ISM System and to provide status in sufficient detail to allow corrective actions to be taken to improve pockets of the program that did not meet implementation expectations. This is a portion of an issue that was identified in the 1998 ISMS verification.

Another significant challenge for the Y-12 Plant management is to evaluate issues in the context of the ISMS Description. The review found that frequently the response to an issue is a corrective action plan that is developed without using ISMS mechanisms. When the corrective action plan is closed, the issue is considered resolved. In some cases, it was noted that the corrective action plan did not have the desired effect. The ISMS function of Feedback and Continuous Improvement, if fully implemented, would provide management the mechanisms to ensure that issues were effectively resolved within the processes or that the processes were adjusted with the Feedback function confirming that the desired results were achieved. Examples include inadequate, incomplete, or not fully effective corrective actions to the NaK accident, the SIP, and the 1998 and 1999 ISMS evaluations.

Opportunity for Improvement

MG.1-2 LMES does not have an evaluation mechanism to determine the overall status of the ISM System and to provide status in sufficient detail to allow the Production Leadership team to develop corrective actions necessary to improve pockets of the program that did not meet those implementation expectations.

MG3-6 The MA program does not fulfill the function for the feedback and improvement as ascribed to it in the ISM System Description. T he LMES Team also identified this issue.

MG.3-7 Issues management is not effective, particularly with regard to the management aspects of determining basic causes for the issues and confirmation of the effectiveness of the corrective actions. In response to both ISMS assessments, the corrective actions for the opportunities for improvement were narrow and shallow.

Noteworthy Practice

MG.4-2 The LMES ISMS Independent Assessment process, as well as the ISMS internal reviews, are a strength that should be retained as an integral part of the Y-12 ISM System Feedback and Improvement function until the routine assessment processes provide the same level of information as to the status of the ISM System at the organizational and Y-12 Site level.

Department of Energy Evaluation

The DOE sub-team assessed the programs, processes, and practices of the ODP. It should be noted that this Office is in a state of transition resulting from the establishment of the NNSA. The Office has been reorganized and there is an ongoing effort to increase the size and competence of the staff. One of the short-term adverse results is a significant reduction in the

number of available Facility Representatives—several have been transferred or promoted to new positions. An aggressive recruitment program across the DOE complex is in progress to fill this vital staff function to the appropriate strength. The reorganization established a division for management of programs and projects. There is a significant staffing shortfall in this division. The ODP is marginally capable of performing its many vital tasks due to staff constraints. Furthermore, the lack of a formal training program to qualify a staff to effectively oversee the many planned capital improvements that are key to the long-term success of the mission at Y-12 is a concern. Finally, due to the misperception that the transition by ODP to a standalone office is complete, there is a noticeable lack of involvement by some ORO managers.

The feedback and continuous improvement function is an area of concern. It was not apparent that issues such as maintenance backlog and inadequate fire protection were being pursued by ODP in a manner to positively influence the contractor. ODP needs to determine the specific requirements for compliance in these types of mission support and overhead areas and then review the WADs to verify appropriate funding levels.

The staff remains under-strength in its role of evaluating and approving safety basis documents. Processes to evaluate some Authorization Basis documents have not been developed. There are no formal ODP processes to provide guidance on the development of the WADs. These situations were noted during the 1998 review. Neither ORO nor ODP has a current quality assurance plan (QAP). The processes required in the QAP, if developed, would be beneficial in resolving identified safety and mission issues. However, in several other areas there has been significant progress in developing the processes associated with contractor oversight and the startup/restart process. The lack of processes has an impact on the definition of roles and responsibilities and the establishment of priorities.

Opportunity for Improvement

DOE.1-1 Y-12 ODP is marginally staffed for current and inadequately staffed for future planned work. Technical SME and qualified FR support must increase, with a clear transition plan for the NNSA reorganization in October 2000.

DOE.3-1 As was noted in the 1998 ISMS Verification, ODP (YSO) has not developed the required processes that will aid in achieving conformance with DOE policy for oversight, lessons learned, or continuous improvement.

Noteworthy Practice

SME.2-1 DOE The continuation of the MPAT for the review of the DOE Project Management System is noteworthy. It clearly provides a driving force for bringing the DOE Project Management System up to expectations.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

This team agrees with the conclusions in the LMES ISMS Independent Assessment.

ISMS is considered implemented when the contractor has the mechanisms in place to fulfill the policy, which is stated simply as "perform the mission safely". The process of achieving the state of "implemented" includes recognizing opportunities to improve and correcting shortcomings.

The ISMS has been implemented in EUO and a portion of the Manufacturing Group (Nuclear Operations) and a portion of the Manufacturing Group is maturing in a satisfactory manner. With isolated exceptions, the organizations in the Balance of Plant remain at varying stages of attempting implementation. Site-wide aspects of the ISMS associated with the Feedback and Continuous Improvement core function are not implemented.

A significant obstacle to achieving implementation of the described ISM System is the absence of a site-wide evaluation mechanism that can provide senior management with the System's current status. Without an analysis of the numerous data streams, the Production Leadership Team is hampered in the development of necessary corrective actions and by the inability to evaluate the effect of corrective actions on improving the system. Examples of where this type of analysis would have been very useful include the status of fire protection systems, of maintenance, and of calibration. These examples may also be indicators of a need for a more rigorous review of the budget requirements that need to be funded to achieve compliance in mission support and overhead areas. Additionally, such a site-wide analysis would have determined where line management had failed to reach the desired expectation of the system. The Production Leadership Team must have the data to ensure that line management is held accountable for full implementation of the ISM System. The lack of progress in the full implementation of the ISMS might have been determined through more rigorous analysis of data collected by the FEB/Mission Success Organization but its oversight role for ISMS implementation has not been developed. The FEB/Mission Success organization has not performed analyses consistent with the vision for that organization.

The opportunities for improvement noted in functions other than Feedback and Continuous Improvement were of such a nature that the current mechanisms would have resolved or prevented these issues from arising if feedback and improvement mechanisms functioned as described.

No issue identified was new or unique. All issues had been previously identified but the ineffectiveness of the Issues Management Process resulted in failure to successfully correct the issues.

4.2 Recommendations

It is recommended that this Y-12 management team, both DOE and contractors, continue to place emphasis on the development, implementation, and execution of a feedback and continuous improvement function that enables them to enhance their ability to perform the Y-12 mission safely. The Leadership Team should continue to forcefully stress implementation of ISMS in Balance of Plant organizations and hold those line managers accountable to achieve the ISMS expectations.

The ISMS Independent Assessments and DOE P 450.5, Line Management Oversight results should provide the contractor with the ability to evaluate the effectiveness of system enhancements as implementation continues to mature. AMDP should consider using Headquarters personnel to assess the improvements of the DOE Safety and Oversight Program on a periodic basis

5.0 LESSONS LEARNED

The LMES ISMS Independent Assessment process is an appropriate use of the ISMS Guide, Chapter 4. The lessons learned from this effort should be used to enhance the guide.

The combination of this verification with the Independent Assessment provided a significantly greater set of data to the verification team to use in their conclusions. There may be value in future oversight efforts, in the implementation of DOE P 450.5, being combined with contractors' self-assessments.

The continuing core expectations should not be used to evaluate systems that have not successfully completed a phase II verification. The use of phase II core expectations was important to the development of the review plan.

The results of the Independent Assessment were of great value and a prerequisite to completion of the verification.

APPENDIX A

OPPORTUNITIES FOR IMPROVEMENT

NOTEWORTHY PRACTICES

Opportunities for Improvement

BBC.1-2 An ODP procedure needs to be written to address the development, integrated review with ES&H/SME personnel and approval process for WADs. The procedures should include review of the integration of BOEs with the ES&H Management Plan. This is a repeat issue from the 1998 Verification.

BBC.1-3 Roles and responsibilities for the ODP personnel are not clearly and formally defined throughout all documentation where they are identified.

BBC.1-4 The ODP procedure for change control of approved tasks and resources needs to be rewritten to provide less financial flexibility to LMES and to lessen the possibility of a year end overrun.

BBC.2-2 The budget year work plans need to be more accurately defined, prioritized and agreed upon with ODP since implementation of the new Congressional control points will reduce the ability to make changes once submitted.

DOE.1-1 Y-12 ODP is marginally staffed for current and inadequately staffed for future planned work. Technical SME and qualified FR support must increase, with a clear transition plan for the NNSA reorganization in October 2000.

DOE.3-1 As was noted in the 1998 ISMS Verification, ODP (YSO) has not developed the required processes that will aid in achieving conformance with DOE policy for oversight, lessons learned, or continuous improvement.

FP.2-2 As it was identified in the ISMS Verification Phase I review in 1998, there is an excessive back-log of fire protection Testing, Maintenance, and Inspection (TM&I) jobs. There are currently approximately 400 fire protection TM&I jobs waiting to be done.

FP.2-3 Line management and ODP have failed to use ISMS mechanisms, in accordance with an agreed upon long-range plan, to raise the Y-12 Fire Protection Program to a compliant level.

HAZ.1-1 There is evidence that coordination between the preparation of Implementation Plans and supporting details for AB work and the final budget reconciliation process is not functioning well, which could lead to continued failure of meeting AB development commitments.

HAZ.1-3 Work instructions and task plans are not yet sufficiently comprehensive to be able to serve as management tools to ensure a disciplined approach to meeting IP commitments.

HAZ.1-4 The staff of FSD and contractor support is currently below that necessary to support the IP and to provide the Facility Safety Engineer function, which is important to the maintenance of facility operations within the Safety Authorization Basis.

HAZ.1-5 There is no sitewide audit program of the quality of Unreviewed Safety Question Determinations being performed by operating organizations.

HAZ.1-6 The effective use of OSBs is important to maintenance of operations within the documented safety basis of a facility. These operations appear to be lacking in formality and discipline.

HAZ.2-1 The process for arriving at an agreed upon scope and funding, and appropriate coordination with Contract Performance Indicators is not yet sufficiently evolved to ensure adequate participation and achieve the necessary integration.

HAZ.2-2 Considering the magnitude and importance of the function, the YSO resource allocation for review and approval of the safety bases is not adequate to ensure success in the planned AB upgrade efforts.

HAZ.2-4 Until the Facility Representative cadre is increased, opportunities for recognition of operational issues of sitewide importance will be limited.

MG.1-1 As the Senior Management is changed as a result of the new contract and the responsibilities and authorities of the ISM System are revised, care must be taken to ensure the principles and detailed requirements of ISMS are clearly identified in the new organization.

MG.1-2 LMES does not have an evaluation mechanism to determine the overall status of the ISM System and to provide status in sufficient detail to allow the Production Leadership team to develop corrective actions necessary to improve pockets of the program that did not meet those implementation expectations.

MG.1-4 There is not a process to insure that proposed changes in a functional area will not result in a degradation of the safety system.

MG.2-2 There are no site-wide performance indicators on the effectiveness of the ISM system tools described in Y15-635PD.

MG.2-3 No command media was found which define the process and responsibilities for updating, trending, and managing the data and metrics on the ISM performance indicators web site.

MG.3-2 The Management Assessment program in the Maintenance Organization is not effective. The Maintenance Organization Management Assessment Program Improvement Plan developed in response to the ISMS Self Assessment is not adequate to gain the necessary improvements.

MG.3-4 The available mechanisms are not effective in providing an accurate status of the site-wide ISMS. Furthermore, the mechanisms do not provide useful information with which senior management can effect change or improvements in the Y-12 ISM System.

MG.3-5 Mission Success, as currently implemented and operating does not achieve the vision stated in the SIP "..to formalize senior management independent assessment function and ISM performance measuring."

MG.3-6 The MA program does not fulfill the function for the feedback and improvement as ascribed to it in the ISM System Description. The LMES Team also identified this issue.

MG.3-7 Issues management is not effective, particularly with regard to the management aspects of determining basic causes for the issues and confirmation of the effectiveness of the corrective actions. In response to both ISMS assessments, the corrective actions for the opportunities for improvement were narrow and shallow.

MG.3-8 A contributing cause for the lack of an integrated evaluation of the status of the Y-12 ISM System is the lack of clear roles and responsibilities and associated implementing mechanisms for evaluation and improvements of the System.

MG.4-1 The POC/CRADs currently used by the MAP, the FEB, and routine independent assessments do not evaluate the status of the ISM System within the organization being assessed.

OP.1-1 Most organizations are not fully implementing the site-wide guidance concerning Plans of the Day (POD) in that most organizations have a daily POD process that only includes maintenance activities.

OP.1-2 The Job Hazard Identification (JHI) checklist was faulty because the nearest applicable item relating to the potential for shorting and arcing caused by low voltage/high current DC was under "fire safety" rather than "electrical safety".

OP.1-3 Two Standing Work Packages that had been issued in late 1998 and had inappropriate work scope were still in use.

OP.1-4 The basic guidance for OSB involvement in activities directs the Operations Manager or System Owner or Organizational Manager)to utilize the OSB as specified in the associated site procedures for planning of work activities, technical reviews of documentation, etc. Few Operations Managers involve the OSB in review of maintenance activities for Grade 3 or 4 work. OSB involvement in maintenance activities below Grades 1 and 2 should be directed on a case by case basis to achieve consistency in hazards identification and development of controls.

OP.1-5 A CSA deficiency was noted in which a 30-inch round assembly dolly and a 2 cylinder chip dolly that had overlapped which affected the center to center spacing required by the CSA. The corrective action was to separate the carts. This deficiency could easily occur again in any storage array that contains a 2-cylinder chip dolly.

OP.2-1 Roles and responsibilities at the facility operations level are not always clearly defined. In several instances there are inconsistencies between site-wide guidance in the Conduct of Operations Manual and individual organizational documents.

OP.2-2 There has been little or no training in the work control process and its various elements given to the personnel who are involved in the process. This includes those directly responsible for development of work packages and their supervisors as well as the facility/customer personnel and line managers who review and approve the packages. In most cases the only exposure has been required reading. The LMES Team also identified this issue.

OP.2-3 The mechanisms available to provide post maintenance feedback are not being used to develop improvements or lessons learned. The LMES Team also identified this issue.

SME.2-2 DOE Since resource limitations appear to play a major role in the ability of ODP to improve the system, it makes sense to develop a comprehensive and resource loaded improvement plan so that Project Management System improvement, including training and staffing levels, can be planned, budgeted, and scheduled.

SME.2-3 LMES Since resource limitations appear to play a major role in the ability of LMES to improve the Project Management system, it makes sense to develop a comprehensive and resource-loaded improvement plan so that Project Management System improvements, including training and staffing levels, can be planned, budgeted, prioritized and scheduled.

Noteworthy Practices

BBC.1-1 In spite of unusually late budget guidance from Headquarters Defense Programs, the ODP through initiative and its knowledge of the Stockpile Management Program managed to ensure that the Site budget process for FY 2002 continued with a minimum amount of disruption.

BBC.2-1 The BOE, WAD, and BCP processes have continued to mature into a useful requirements-based budgeting approach that should be sustained through the upcoming contract transition.

FP.2-1 Several initiatives, such as developing a Fire Protection Program Manual and the hiring of three new Fire Protection Engineers, are encouraging.

HAZ.1-2 It is noteworthy that the Facility Safety Division is in the process of developing work instructions (Y74-48-xxxINS) and has task plans for AB projects. This is in an effort to better control the accomplishment of work in accordance with commitments and to provide a training vehicle for new staff.

HAZ.1-7 The HEUMF project is being considered for a pilot project with the objective of developing a DOE Standard that would provide guidance and rationalization for safety analyses that are routinely done throughout the complex for various different needs (SAR/BIOs, FHAs, Emergency Management, NEPA documents, Criticality Safety Evaluations, etc.).

HAZ.2-3 The AB Manager has taken initiatives to develop an approach to safety basis documentation and authorization of operations for hazardous non nuclear facilities and also an initiative for a pilot project related to achieving efficiencies in hazard and accident analyses.

MG.1-3 A corporate Lockheed Martin team reviewed accidents that occurred at Oak Ridge and other Lockheed Martin DOE sites for common causal factors. This report contains an excellent analysis and provides worthwhile recommendations for improvement and expectations for LMES safety systems.

MG.2-1 The development and use of organization-specific performance indicators by ACO and EUO is commendable.

MG.2-4 The recent use of performance indicators and trend information to improve performance in the environmental compliance area in commendable.

MG.3-1 The management assessment monthly reports prepared by the EUO Assessment coordinator provided timely and useful information to EUO management. Data included trends and metrics to assess performance in a number of areas of interest.

MG.3-3 Capturing the data from the supervisory self-assessments in the workplace, analyzing that data, and providing the useful information through the MMO weekly safety bulletin is considered to be a noteworthy practice.

MG.4-2 The LMES ISMS Independent Assessment process as well as the ISMS internal reviews are a strength that should be retained as an integral part of the Y-12 ISM System Feedback and Improvement function until the routine assessment processes provide the same level of information as to the status of the ISM System at the organizational and Y-12 Site level.

SME.2-1 DOE The continuation of the MPAT for the review of the DOE Project Management System is noteworthy. It clearly provides a driving force for bringing the DOE Project Management System up to expectations.

SME.2-1 LMES The continuation of the MPAT for the review of the LMES Project Management System is noteworthy. It clearly provides a driving force for bringing the LMES Project Management System up to DOE expectations.

SME.2-2 LMES The roll up of the engineering related corrective actions into a "projectized" *Y-12 Conduct of Engineering Improvement Implementation Plan* that integrates all the engineering corrective actions into a cohesive, resource-loaded improvement implementation plan provided the basis for an effective and efficient realignment of engineering functions.

APPENDIX B

TEAM BIOGRAPHIES

Joseph King has over 30 years of operational experience in the U.S. Navy. He was directly involved in the management, supervision, and operation of naval nuclear reactors. His experience includes assignments that involved initial startup of eight reactors and command of the nuclear power cruiser USS Virginia (CGN 38) for over three years. As the Nuclear Power Readiness and Training Officer for the Surface Force U.S. Atlantic Fleet, he directed a team of nuclear-qualified officers who assured that nuclear powered ships were operated to the highest standards. In addition, he directed the certification effort on initial startup of two ships. This certification assured that the management and crew training met the required standards for safe operation and crew emergency response effectiveness prior to initial at-sea operations. Most recently, Mr. King was a Deputy Commander of the Naval Sea Systems Command, involved in program management, acquisition, and maintenance.

Mr. King joined the Department of Energy (DOE) in 1991. His duties have included involvement in Operations Support including Operational Readiness Reviews (ORRs), Defense Nuclear Facilities Safety Board Recommendations and technical support to line management. Mr. King is currently a nuclear engineer in the Office of Associate DAS for Technical and Environmental Support (DP-45). He participated in the ORRs for Buildings 371, 559, and 707, both at Rocky Flats, the evaluation of Plutonium Start-up Test Program for Building 559, as well as the ORR for the Replacement Tritium Facility at Savannah River Site. He was the Team Leader for the F-Canyon, FB-Line, ITP, CIF, and DWPF ORRs.

Joseph Arango has twelve years of experience in various engineering disciplines supporting the development and implementation of program plans for the Department of Energy and the Department of Defense. He holds a Masters Degree in Industrial and Systems Engineering from Virginia Tech and a B.S. in Mathematics from the U.S. Naval Academy. Since 1995, Mr. Arango has worked in the Office of the Departmental Representative to the Defense Nuclear Facilities Safety Board on a variety of safety issues identified by the Board including integrated safety management. He is also currently serving as the Program Manager for the Department of Energy's Facility Representative Program. From 1988 to 1995, as an Acquisition and Engineering Manager in private industry, he provided program management and engineering support for a Navy combat system design and development contract. Prior to 1988, he gained seven years of experience in the Navy nuclear power program and qualified in submarines and as a Nuclear Engineering Officer. He participated in Integrated Safety Management System Phase I and II Verifications at Rocky Flats and at the Oak Ridge Y-12 Plant, as well as a preliminary Phase I Verification at Lawrence Livermore National Laboratory's Building 332. He was the Verification Team Leader for the Idaho National Engineering and Environmental Laboratory (INEEL) Phase I in April 1999 and for the INEEL Phase II in September 1999. He also led a group of six Verification Team Leaders in the October 1999 analysis of ISMS Verification Reports from Fiscal Years 1997-1999.

David Chaney has over 29 years of operational experience between U.S. Navy and commercial nuclear power. He was directly involved in the management, supervision, and operation of naval nuclear reactors. His experience includes assignments that involved SSBN shipyard overhaul and extended refit periods, and engineering department head qualification in nuclear powered

submarines. As the CSS-14 SSBN Shipsystem Maintenance Monitoring Support Officer, he reported to the Commander Submarine Squadron 14. He directed a team of handpicked officers/senior enlisted who assured that the 10 SSBN's remotely deployed from Holy Loch, Scotland were able to extend the SSBN operating cycle from 5 to 15 years between shipyard availability. In his current Naval Reserve capacity, he is the Deputy Director for Reserve Affairs, Submarine Warfare (OPNAV N87R) and has recently completed the U.S. Naval War College Senior Resident Program, being awarded a Master of Arts Degree in National Security and Strategic Studies.

In the commercial nuclear industry, while reporting to the VP Nuclear Operations, Mr. Chaney was certified by Westinghouse as a Senior Reactor Operator in an executive management succession program. Upon completion, he directed and implemented the nuclear utility response to the first Safety System Functional Inspection (SSFI) performed by the Nuclear Regulatory Commission. Later assigned as Site Engineering Manager and Corporate Licensing Director, he was responsible for coordinating efforts necessary to maintain the commercial operating licenses for four pressurized water reactors (PWRs) and improving operational safety performance at one site on the NRC's watch list. This site was removed from NRC's watch list on his "watch". Qualified as an Emergency Management Recovery Manager and Emergency Control Officer, he was the Master of Ceremonies in a successful effort at FPL Group, which resulted in the 1st ever U.S. award by the Japanese Union of Scientists and Engineers (JUSE) of the Deming Medal.

Mr. Chaney joined the Department of Energy (DOE) in 1992. His duties have included involvement in Standards Development and Operations Support including Conduct of Operations implementation planning and reviews, Defense Nuclear Facilities Safety Board Recommendations and program line management. Mr. Chaney is currently the Acting Deputy Director for the Office of Operations and Readiness (DP-24) for the DAS for Stockpile Management and Operations (DP-20). He is certified by the UnderSecretary of Energy as an ISMS-V Team Leader and has participated as a team member in ISMS-V's at Savannah River, Pantex and Oak Ridge Y-12. He was the Team Leader for a Federal COO Y-12 assessment and Materials-in-Inventory DOE team. He is a graduate of the Federal Executive Institute and U.S. Naval Academy.

Christopher Chisholm holds a BS degree in Naval Science from the United States Naval Academy. Mr. Chisholm has 30 years of experience in nuclear operations and management. He served for 24 years as a commissioned officer in the U.S. Navy, including tours as Commanding Officer of nuclear powered fleet ballistic missile submarine and Chief, Nuclear Force Analysis Division, Joint Chiefs of Staff. For the past seven years he has provided technical and management support to the Department of Energy (DOE) and several DOE Management & Operations (M&O) contractors, including Los Alamos and Lawrence Livermore National Laboratories. This support has included: facility management mentoring, DOE Integrated Safety Management System (ISMS) verifications; contractor Operational Readiness Review (ORR) assessments; conduct of operations and conduct of maintenance assessments and evaluations; monitoring and evaluation of on-shift operations, evolutions, and drills; mentoring shift supervisory personnel; technical assistance in upgrading conduct of operations, conduct of maintenance, and training programs to comply with Defense Nuclear Facility Safety Board (DNFSB) Recommendations and DOE guidance; and configuration management and systems

engineering program development. Currently he is supporting DOE, Defense Programs (DP), Headquarters staff, including the DP-45 manager responsible for conducting ISMS verifications and ORRs.

Jennifer Clay joined the Department of Energy (DOE) in 1990. She currently works for the National Nuclear Security Administration, Oak Ridge Operations Office, as a Technical Facility Representative for the Y-12 Plant. She is interim qualified as a Facility Representative for the Development Organization, where the major types of operations include: materials and metallurgical engineering research, chemistry and chemical engineering research, characterization and inspection research, and fabrication systems research. As a Facility Representative, Ms. Clay's specific duties include daily oversight of the Development Organization activities in the areas of public and personnel health and safety; industrial and nuclear safety; environmental protection; facility modification, repair, and maintenance; formality of operations; and overall implementation of integrated safety management objectives, principles, and functions.

Prior to joining the Oak Ridge Operations Office, Ms. Clay served several roles in the Office of Environmental Management in Washington, DC from 1990 to August 1999. She lead the Environmental Restoration (ER) Waste Issues Cross-Cutting Team established by the Deputy Assistant Secretary for Environmental Restoration comprised of Federal and contractor staff from all Field Offices and Headquarters. The team provided a forum to communicate waste management practices used across the complex for ER projects. The team discussed operational health, safety, and engineering issues; sought solutions for Field Offices encountering difficulties with specific wastes during the planning or execution of cleanup activities; and strove to improve the ease and efficiency of dispositioning ER waste streams. Ms. Clay is also recognized as a national expert and technical advisor in the implementation of and compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the National Environmental Policy Act (NEPA), corrective actions under the Resource Conservation and Recovery Act (RCRA), and DOE's Radioactive Waste Management Order for low-level waste issues. She has prepared guidance associated with the implementation of these regulations and internal DOE requirements with the objective of simplifying and streamlining any overlapping requirements for ER projects so Field Offices could proceed with cleanup and decommissioning work more effectively and efficiently.

Ms. Clay worked for NUS Corporation from 1982 to 1990. She served as both the Team Coordinator for contractor personnel and as the CERCLA Specialist on the Environmental Subteam of three Tiger Team Assessments at Fernald, Mound, and Sandia-Livermore. In addition, Ms. Clay was Team Coordinator of a seven-person multi-disciplinary team of professionals performing environmental audits and assessments at DOE facilities to identify environmental problems, compliance status, and waste management issues. In this capacity, she gained extensive experience and knowledge of the environmental programs of 10 major DOE facilities, including Oak Ridge National Laboratory, Los Alamos National Laboratory, Sandia National Laboratory-Albuquerque, Hanford Site, Savannah River Site, Fernald, Pantex, Lawrence Berkeley Laboratory, Laboratory for Energy-Related Health Research, and Stanford Linear Accelerator Center.

Douglas Dearolph holds a Bachelor of Science degree in Mathematics from the University of South Carolina and a Master in Business Administration from Georgia State University. Mr. Dearolph has 22 years of experience related to the nuclear industry. The first 11 years were spent in the Naval Nuclear Propulsion program. He served both as division officer and department head on nuclear submarines. He certified as a nuclear engineer officer by the Naval Reactors division of the Department of Energy (DOE.) The remaining 11 years have been at the Savannah River Site (SRS); 3 years with Westinghouse Savannah River Company (WSRC) and 8 years with the Department of Energy. Mr. Dearolph has held various positions at SRS including certification as Reactor Supervisor for K Production Reactor, a Technical Support engineer for the Savannah River Special Project Office, DOE Facility Representative for K-Reactor and Senior Facility Representative of the nuclear chemical facilities located within F-area of the Nuclear Materials Stabilization and Storage division.

Mr. Dearolph has had direct responsibility in several different areas of nuclear reactor and non-reactor nuclear plant operations. These areas included: technical specifications, safety evaluations, configuration management, safety analysis, project management, systems engineering, design engineering, nuclear and criticality safety, emergency response, conduct of operations and conduct of maintenance. Mr. Dearolph's team participation include: DOE-SR Validation for the restart of both F-Canyon Phase I and FB-Line Operational Readiness Reviews, DOE-SR manager for the restart of F-Canyon Phase II, Savannah River Site Integrated Safety Management Systems (ISMS) Phase I review, FB-Line facility ISMS Phase II Pilot Review, H-Canyon Phase II Readiness Assessment, Operational Readiness Reviews Phase A1 and A2 for the restart of Enriched Uranium Operations at the Y-12 Facility, and the DOE-YSO Restart Manager for the resumption of nuclear material handling at the 9212 Facility. Currently, Mr. Dearolph is assigned as the DOE Nuclear Safety Program manager and is charged with the oversight and technical direction of the nuclear and criticality safety programs at the Savannah River Site.

James Donnelly has a Bachelor of Science Degree in Geological Engineering from Michigan Technological University and has 15 years experience in the environmental and waste management field. Mr. Donnelly has also taken several graduate level courses in health physics and environmental science. He successfully passed the Engineer In Training exam and has completed the DOE Technical Qualification Program for Environmental Compliance.

From 1985 until 1988, Mr. Donnelly was employed by the Nuclear Regulatory Commission. He worked primarily on quality assurance issues for the monitored retrievable storage and high level waste repository programs. Mr. Donnelly's duties frequently involved interfacing with state regulators, Native American tribes, and professional organizations. In addition, he was the lead on developing two key guidance documents for the high level waste repository program.

In 1988, Mr. Donnelly joined DOE as a Quality Engineer at the Richland Operations Office. His primary duty was performing independent assessments of contractor environmental and waste management activities. Mr. Donnelly was certified as a Lead Auditor in accordance with the requirements of NQA-1. He had a lead role in developing the operational procedures for the independent assessment group.

In December 1991, Mr. Donnelly joined Oak Ridge Operations (ORO) as an Environmental Engineer. He performed numerous functional appraisals of contractor environmental and waste management activities at numerous ORO sites (e.g., Weldon Spring, Portsmouth, Paducah, Y-12, and K-25). Mr. Donnelly has also participated in two readiness reviews and two readiness assessments. Mr. Donnelly was a team member on the Phase I and II Integrated Safety Management assessment of the Y-12 Plant in 1998. Mr. Donnelly provides matrix support to the Y-12 Defense Programs office in the environmental compliance and waste management programs.

Richard Englehart has twenty years technical and management direction experience for nuclear safety and environmental analyses for nuclear power, uranium fuel cycle, Pu-238 radioisotope thermoelectric generator (RTG) NASA missions, and DOE non-reactor nuclear facilities. He also has seven years experience in nuclear safety policy and standards development and implementation advice. He has participated in ISMS Verifications at Y-12 Plant, Pantex, and a mini verification at the LLNL Plutonium Facility (B332) in the area of Hazards (identification and controls). He has participated in a verification at INEEL in the areas of DOE and all areas for a subset of INEEL facilities. He is certified as an ISM Implementation Team Leader.

Dr. Englehart joined DOE in 1990 in the New Production Reactors Program. He was on the staff of the Chief Engineer as a senior advisor and also was Director, Office of Environment for the program. In 1992 he joined the Office of Nuclear Safety Policy and Standards, where he has had responsibility for the Safety Analysis Report (5480.23), Technical Safety Requirements (5480.22), Unreviewed Safety Question (5480.21), and Nuclear Safety Design Criteria (420.1, section 4.1) Orders. This includes drafting guidance, interpretations and advice regarding implementation. Prior to DOE, Dr. Englehart was employed by NUS Corporation for 18 years, providing services to the nuclear power industry and to DOE as a principle investigator, project manager, department manager (radiological programs), and assistant division manager. He was an assistant professor of Nuclear Engineering at the University of Florida and was director of the University research reactor for four years. He holds a B. S. in Mechanical Engineering from Carnegie Mellon University and an M. S. and Ph.D. in Nuclear Engineering from Pennsylvania State University.

William Froh currently works as a Fire Protection Engineer for Defense Programs. He received a B. S. Degree in Fire Protection Engineering from the University of Maryland. He has participated in Operational Readiness Reviews or Readiness Assessments for several facilities, including the Defense Waste Processing Facility (SRS), Consolidated Incinerator Facility (SRS), Plutonium Facility (LLNL), Zone 4 Stage Right (Pantex), Device Assembly Facility (DAF), and Material Storage Project at K-Area (SRS). While working as a Fire Protection Engineer for the Naval Sea Systems Command (NAVSEA), Mr. Froh's responsibilities included input to the fire protection design of the Navy's newest nuclear powered submarine, the SSN 21, implementing fire protection upgrades to existing ships and submarines, establishing fire fighting doctrine for the fleet, and managing a program to test the fire resistance of composite materials proposed for use on ships. He also participated in ship and submarine surveys as part of the Navy's Board of Inspection and Survey (INSURV). He is a principal member of two National Fire Protection Association standard committees – the Halon Alternatives Committee (NFPA 2001), and the Water Mist Committee (NFPA 750).

William Hicks has a B. S. Degree in Engineering, as well as Naval Nuclear Power training including qualification for command. He has more than 25 years of experience in nuclear programs with the United States Nuclear Submarine Force and in support of the Department of Energy (DOE) with EG&G Idaho, Lockheed Martin Idaho Technology Company (LMITCO) and recently with XL Associates Inc. His experience includes three years as Nuclear Submarine Squadron Commander, two years as Senior Member of the Fleet Nuclear Propulsion Examining Board, as well as over eight years conducting Technical Safety Appraisals, Operational Readiness Reviews and ISMS Verifications for DOE, EG&G, and LMITCO. In addition, Mr. Hicks conducted numerous management assistant and mentoring activities across DOE in support of Defense Programs (DP) and Environmental Restoration and Waste Management (EM) activities. He has also actively supported numerous Headquarters activities throughout his eight-year period of support for DP. Many of the activities were associated with responses to various recommendations from the Defense Nuclear Facilities Safety Board (DNFSB). He is also a primary author of the DOE Technical Standard for the Conduct of Operational Readiness Review/Assessments as well as the ISMS Verification Team Leaders Handbook. His readiness review/assessment experience includes: Team Leader for Corporate ORRs for TRA Area Hot Cells; Waste Reduction Experimental Facility (WREF); several RAs at Advanced Test Reactor; Team member on the Pantex Zone 4 DOE ORR; Device Assembly Facility ORR, PFP Thermal Treatment ORR; Pantex Building 12-116 ORR Assistant Team Leader for the K-15 Deposit Removal Project ORR; Senior Scientific Advisor for the ORR on the Facility Control System at LANL; ACRR Reactor Startup; W56 Disassembly RA Team member; and sub-team leader for several ISMS Verifications at Savannah River Site, Y-12, Rocky Flats, and Nevada Test Site.

Mr. Hicks has served as a mentor and provided training for both the contractor and the DOE managers responsible for achieving and overseeing readiness for the resumption assessments at Y-12, K-25, the Mound Plant, and Spent Nuclear Fuels Project in Hanford. He has also acted as mentor and advisor in restart matters at INEL, Pantex, Oak Ridge Y-12 and K-25, and ORNL. He has also acted as mentor and is considered a DOE expert in development and implementation of Integrated Safety Management Systems (ISMS).

Michael Miller Mr. Miller joined the Department of Energy in December 1989. He is a Facility Representative at the Y-12 Weapons Plant in Oak Ridge Tennessee. He holds a BS Degree from North Carolina State University and is a Licensed Professional Engineer in the State of Tennessee. His job experience includes performing the Facility Representative duties at the Y-12 Site for 5 years and at the Savannah River Site for 5 years. He worked as a Maintenance and System Engineer for 8 years at several commercial nuclear power plants and served 6 years in the US Navy Nuclear Power Program.

Anthony Neglia received a B. S. in Electrical Engineering from the University of Detroit and an M. S. in Environmental Science from George Washington University. He also has an MBA in management. He has 17 years experience with the Department of Energy and its predecessor agency. He is assigned to the Environmental and Regulatory Support Division as an environmental analyst where current activities include development of Defense Programs (DP)-wide RCRA training guidance and development of the DP ES&H Five-Year Plan. Prior assignments included: environmental policy analyst in the ES&H Coordination Group that

provided support and advice to the Assistant Secretary for Defense Programs and DP programs on ES&H policies and compliance with environmental laws, particularly the National Environmental Policy Act; Division Director for the Program Analysis and Resource Management Division that provided budget, construction management, planning and administrative support to the Reconfiguration, Arms Control, Intelligence and Safeguards and Security programs; and construction manager for the nuclear weapons programs providing oversight and in depth review of design, utilities, equipment, NEPA documentation, cost and justification of construction projects. Also, he has several years of military service in the Army to include nuclear weapons effects officer and nuclear weapons unit commander.

Ken Perkins is presently a senior nuclear engineer and group leader in the Nuclear Science and Technology Division at Brookhaven National Laboratory. He has 26 years of nuclear safety experience at Idaho National Engineering Laboratory and BNL since earning a Ph.D. in Mechanical Engineering at the University of Arizona.

Dr. Perkins is currently supporting DOE EH-31, Nuclear Safety Policy and Standards, in the development of implementation guides and standards for the Draft DOE Nuclear Safety rules and three digit Orders. He has recently been working with DOE EH-31 in responding to DNFSB recommendation 95-2. He has helped develop the Integrated Safety Management System Guide, DOE G 450.4-1 and has participated in ISMS reviews at Savannah River, Rocky Flats, Oak Ridge and the Nevada Test Site. He is also supporting the NRC Office of International Programs in strengthening regulatory oversight in the former Soviet Union. He previously participated in the development of safety guides for the Facility Safety Order, DOE 420.1, and the TSR and SAR Draft Rules. He also served on the DOE review team for the Natural Phenomena Hazards Mitigation Order and associated standards.

Dr. Perkins' previous experience at BNL and INEL encompassed design development and licensing support for research, commercial and advanced concept nuclear reactors with emphasis on safety design, accident analysis and verification of licensing calculations.

Robin Phillips has more than ten years experience providing technical writing, editing, and document control services to the Department of Energy. She provides technical editing to Operational Readiness Review (ORR) and Integrated Safety Management Verification (ISMSV) teams at the various sites they visit. She has assisted ORR teams at the Department's Savannah River Site at H-Canyon, FB-Line, DWPF, CIF, HB-Line and F-Canyon. She provided editing and document control assistance to ISMV teams at Savannah River and Rocky Flats. In addition to the writing and editing for ORR and ISMSV teams, Ms. Phillips assembles and prepares the background, scope, and facility information prior to the onsite review; makes working draft reports available to team members and approved site personnel; and assists the coordinator in logistics planning. When not assisting ORR and ISMSV teams, Ms. Phillips edits draft DOE technical standards, handbooks, and guides. She assists in the comment resolution process by tracking the various authors and their comments to final resolution in the document. She is also the Coordinating Editor of the *CTG Gazette*, the Core Technical Group newsletter. Her responsibilities include writing, editing and revising articles submitted; maintaining the story board listing all the articles for an issue, their status and contact points for the Managing Editor;

obtaining necessary concurrences; and working with graphics and prints shop of publication and distribution of the newsletter.

Prior to her work with the Department of Energy, Ms. Phillips specialized in developing educational materials and training programs in wellness and health, on designing approaches and adapting materials for special needs children and their family, and on curriculum based classroom exercises for elementary and middle school students. She holds a Master's Degree in Education from Georgia State University and a Bachelor of Arts from Connecticut College for Women.

Wayne Rickman is presently employed as a Principal Analysts and Senior Vice-President of Nuclear Operations for Sonalysts Inc. He has had more than 30 years of operational experience in the Naval Nuclear Propulsion (submarine) Program, achieving the rank of Rear Admiral.

Mr. Rickman, in his current assignment has supported the Department of Energy in the verification of the Integrated Safety Management System in the complex. He has participated in the reviews at Savannah River Site, including FB Line, and DWPF facilities, at Rocky Flats twice, Waste Isolation Pilot Plant (WIPP), Oak Ridge Y-12, Tank Farms at Hanford, and a Phase I and two Phase II (partial) reviews at INEEL, Idaho. Additionally Mr. Rickman participated as the ISM subject matter expert of the External Independent Review team of BNFL's safety posture at DOE activities within the United States.

Also, Mr. Rickman has supported the Department of Energy as a Senior Nuclear Advisor on Operational Readiness Reviews (ORR). Mr. Rickman has served as a senior nuclear advisor for the ORRs for Building 707 and Tank Draining in Building 771 at Rocky Flats. Additionally he has served as a senior nuclear advisor for eight ORRs at Savannah River Site including F-Canyon (2), FB Line, H Canyon, HB Line, Replacement Tritium Facility, In-Tank Processing Facility, And the Defense Waste Processing Facility. During the ORR for Building 559 at Rocky Flats, Mr. Rickman participated as the training and management systems group leader. He was involved in the internal briefings within DOE and to the DNFSB and participated in the any public hearings concerning ORRs for those facilities.

Mr. Rickman served as a mentor for Los Alamos National Laboratory more than two years. In particular, he helped the head of facilities in the implementation of a facility Management system. He also has served as a member of the Operations Improvement Panel at Pacific Northwest National Laboratory. This Operations panel monitored and made recommendations for improvements in the ES&H and conduct of operations areas of that laboratory.

Mr. Rickman provided management and training support to the Consolidated Incinerator Facility at Savannah River Site as a senior industrial consultant. He helped in the preparation of the operators' qualification standard. He also prepared a readiness verification procedure and helped in the execution of that procedure to insure facility operational readiness. This procedure allowed the Contractor and DOE ORR to be conducted in parallel with each other.

Mr. Rickman was the technical director for the DOE operator's certification program for "K" reactor operators as part of the "K" reactor restart program at SRS.

While in the Navy, RADM Rickman was involved in the training and qualification of personnel in the Naval Nuclear Propulsion and the Naval Nuclear Weapons Programs. He served as commanding officer of two submarines, including a Trident submarine with the Navy's largest and newest submerged power reactor and the Trident C-4 weapons' system. In addition, Mr. Rickman served as a Deputy Commander for training for a submarine squadron, where he directed, monitored, and evaluated the training and qualification of submarine crews in operations of nuclear reactors and nuclear weapons. He also served as special assistant to the Director, Naval Nuclear Propulsion Program, where he was responsible for the selection, qualification, training, and assignment of personnel who supervise, operate, and maintain naval nuclear propulsion plants. Mr. Rickman's last assignment as a Rear Admiral was the Flag Officer responsible for training in the Atlantic fleet. He was responsible for 14 diverse training organizations with 2,000 instructors in more than 650 courses and a throughput of 175,000 students per year.

Stanley Watkins graduated from Oklahoma State University, Stillwater, Oklahoma in 1971 with a BSME (Design Curriculum). He worked as a student employee for OSU Hydrogen Engine Research Project to obtain data for hydrocarbon and oxides of nitrogen emissions from hydrogen fueled engine. This work involved design modifications to a national standard cooperative fuels research engine to enable the engine to be operated on hydrogen and modifications to convert a small gasoline engine to hydrogen operation. Mr. Watkins served as a Technical Measurements Engineer, Metrology Lab. Quality Division, Mason and Hanger, USDOE Pantex Nuclear Weapon Assembly Plant from 1971-1973. He served as technical support for calibration of nuclear weapon production test/measurement systems. From 1974-1982, Mr. Watkins served as Acceptance Equipment Engineer, Quality Control Department, Quality Division, Mason & Hanger-Silas Mason Co. Inc. at the Pantex Plant. He was responsible for numerous test and measurement systems used on nuclear weapon components, subassemblies, and completed nuclear weapon assemblies.

From 1982-88, Mr. Watkins was employed by the Department of Energy as Quality Assurance Engineer, Quality Assurance Branch, Amarillo Area Office (PANTEX Plant) USDOE. Duties included performance of technical process evaluations of Contractor's Nuclear Weapon and High Explosive production activities. Performed oversight of contractor's production and quality control operations producing nuclear weapon components, subassemblies, and complete final weapon assemblies per requirements of the Nuclear Weapon Design Laboratories' specifications and DOE Weapon Quality Requirements.

In 1988 Mr. Watkins moved to Knoxville, TN and was employed at the DOE ORO Y-12 Site Office as Quality Assurance Engineer in the Nuclear Weapon Component Production Quality Assurance Branch. He was responsible for overseeing Y-12 Plant Contractor Nuclear preproduction activities involved in new nuclear weapon production programs. He reviewed production, assembly, testing, and inspection processes to assure proposed production operations would produce weapon material of acceptable quality levels to meet nuclear weapon design specifications. In 1991 Mr. Watkins became the Chief of the nuclear weapon component production Quality Assurance Branch, Y-12 Site Office, OR, USDOE and was responsible for management of DOE oversight of the Y-12 nuclear weapon component and subassembly

production and quality control operations. His activities and responsibilities included performing oversight to requirements of AL-DOE nuclear weapon production quality requirements manual (QC-1) and active involvement with Y-12 activities associated with design and production of W88 retrofit program.

When weapon production activities were halted at Y-12, Mr. Watkins was transferred to the Y-12 Facility Representative position responsible for oversight of the Nuclear Material Access Areas of Buildings 9204-2, 9204-2E, 9204-4, and 9720-5. His duties involved active evaluation and monitoring of activities performed in nuclear Material Access Areas for Safety, Health, Quality, and Environmental effects. In 1993 Mr. Watkins' Facility Representative responsibilities were changed to oversight of Nuclear Production Facilities of the 9212/9215 Complex. His duties involved active evaluation and monitoring of contractor operations and activities concerning the Safety, Health, Quality and the Environment. Mr. Watkins held qualifications as nuclear weapon production quality assurance engineer for multiple nuclear weapons programs at the Pantex Plant and the Y-12 Plant. He has held Facility Representative qualifications in the Enriched Uranium Operations Facilities at Y-12 since 1996.